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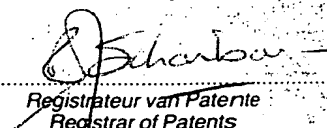
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PCT

- 1) South African Patent Application No. 98/4418 accompanied by a Provisional Specification was originally filed at the South African Patent Office on the 25th May 1998, in the name of Radical Waters (Proprietary) Limited in respect of an invention entitled: "Bacterial Treatment of Bio-Film in Food Storage Containers".
- 2) The application was subsequently postdated, first to the 3rd September 1998, then to the 23rd September 1998, then to the 8th October 1998, then to the 18th October 1998, and finally to the 23rd October 1998. By virtue of such postdating the effective filing date of the application is the 23rd October 1998.
- 3) The photocopy attached hereto is a true copy of the provisional specification and drawings filed with South African Patent Application No. 98/4418.

Gedien te
Sed at PRETORIAin die Republiek van Suid-Afrika, hierdie
in the Republic of South Africa, this25th dag van
day of

October 1999


 Registrateur van Patente
 Registrar of Patents

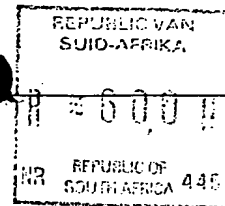
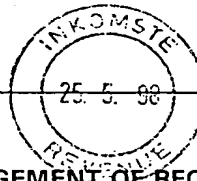
D.M. KISCH INC. , Johannesburg

REPUBLIC OF SOUTH AFRICA
PATENTS ACT, 1978

APPLICATION FOR A PATENT AND ACKNOWLEDGEMENT OF RECEIPT

(Section 30 (1) - Regulation 22)

The grant of a patent is hereby requested by the undermentioned applicant on the basis of the present application filed in duplicate.



Form P.1

PATENT APPLICATION NO.	
21	01 384418

AGENT'S REFERENCE
P/98/76443

FULL NAME(S) OF APPLICANT(S)	
71	RADICAL WATERS (PROPRIETARY) LIMITED

ADDRESS(ES) OF APPLICANT(S)	
	3/458 West Street Glen Austen Ext. 3 Midrand Gauteng Province South Africa

TITLE OF INVENTION	
54	BACTERICIDAL TREATMENT OF BIO-FILM IN FOOD STORAGE CONTAINERS
	THE APPLICANT CLAIMS PRIORITY AS SET OUT ON THE ACCOMPANYING FORM P.2. The earliest priority claimed is
	THIS APPLICATION IS FOR A PATENT OF ADDITION TO PATENT APPLICATION NO. 21 01
	THIS APPLICATION IS A FRESH APPLICATION IN TERMS OF SECTION 37 AND BASED ON APPLICATION NO. 21 01

THIS APPLICATION IS ACCOMPANIED BY :	
X	1 A single copy of a provisional xxxxxxx complete specification of 8 pages.
	2 Drawings of sheets.
	3 Publication particulars and abstract (Form P.8. in duplicate).
	4 A copy of Figure of the drawings for the abstract.
	5 An assignment of invention.
	6 Certified priority document(s) (State number).
	7 Translation of priority document(s).
	8 An assignment of priority rights.
	9 A copy of Form P.2 and specification of S.A. Patent Application No. 21 01
	10 A declaration and power of attorney on Form P.3.
	11 Request for ante-dating on Form P.4.
	12 Request for classification on Form P.9.
	13

DATED THIS 25 th DAY OF May 1998

Patent Attorney for the Applicant(s)

ADDRESS FOR SERVICE	
74	D.M. KISCH INC. 66 Wierda Road East Wierda Valley Sandton, Johannesburg

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OFFICIAL DATE STAMP	
23/5/98 8/10/98	
1998-05-25	
03.07.1998	
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D.M. KISCH INC. , Johannesburg

Patent Attorneys & Trademark Agents
Attorneys & Notaries

Form P.6

REPUBLIC OF SOUTH AFRICA

PATENTS ACT, 1978.

PROVISIONAL SPECIFICATION

(Section 30 (1) - Regulation 27)

Post-dated 8/10/98 23-10-98

PATENT APPLICATION NO.			LODGING DATE <i>23-7-98</i>		AGENT'S REFERENCE
21	01	184418	22	25-05-1998 <i>03-07-98</i>	P/98/76443

FULL NAME(S) OF APPLICANT(S)	
71	RADICAL WATERS (PROPRIETARY) LIMITED

FULL NAME(S) OF INVENTOR(S)	
72	GILBERT THEO HINZE

TITLE OF INVENTION	
54	BACTERICIDAL TREATMENT OF BIO-FILM IN FOOD STORAGE CONTAINERS

This invention relates to bactericidal treatment of bio-film in food storage containers. More particularly, the invention relates to bactericidal treatment of bio-film in bulk food storage containers.

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The use of bulk storage containers such as on fishing boats and trawlers, traveling out to sea for lengthy periods on their fishing trips is well known. As the fish are caught, they are stored typically in crushed ice in the storage containers and hulls of trawlers and boats. Once sufficient fish have been caught, the trawlers return to harbor where the fish are off-loaded and processed. On many of the fishing trawlers, much of the processing, such as "gutting", is done on board out at sea.

The problem with fish is their perishable nature. This is largely due to bacterial contamination. A primary source of this contamination is the bacterial bio-film that exists on the inside of the storage hulls on these fishing trawlers and that as provided by the guts residue in the gutted fish. Through the storage of freshly caught fish in these hulls, the fish are exposed to bacterial contamination from the bio-film and the gut residue, thereby reducing the shelf life of the fish.

It is accordingly an object of this invention to increase the shelf life of produce such as fresh fish in bulk containers by overcoming or at least minimising the above disadvantage.

According to a first aspect of the invention there is provided a method for bactericidal treatment of bulk containers for produce such as fresh fish including the step of wetting a container with anion containing aqueous solution.

According to a second aspect of the invention there is provided produce such as fresh fish characterised in that it has been stored in a bulk container, the bulk container having been treated with anion containing bactericidal aqueous solution.

The fresh fish may have been packed in ice in the bulk container, the ice being characterised in that it was made from an anion containing bactericidal aqueous solution.

According to a third aspect of the invention there is provided a bulk storage container facility for produce such as fresh fish, the bulk storage facility being characterised in that it includes means for providing an anion containing bactericidal aqueous solution for wetting an internal container surface of the facility.

According to a fourth aspect of the invention there is provided a boat or trawler suitable for transporting produce such as fresh fish, the boat or trawler being characterised in that it is provided with means for providing an anion containing bactericidal aqueous solution.

The boat or trawler may be provided with means for providing the aqueous solution in iced form.

The aqueous anion-containing solution may be prepared by means of electrolysis of an aqueous solution of a salt. The salt may be sodium chloride. In particular, it may be non-iodated sodium chloride or potassium chloride.

The anion-containing solution and the associated cation-containing solution may be produced by an electro-chemical reactor or so-called machine. The anion-containing solution is referred to hereinafter for brevity as the "anolyte solution" or "anolyte" and the cation-containing solution is referred to hereinafter for brevity as the "catholyte solution" or "catholyte".

The anolyte solution may be produced from about 10% aqueous NaCl solution electrolysed to produce radical cation and radical anion species, the anolyte solution having a redox potential of about between +300mV and +1200mV. These species may be labile and after about 48 hours the various radical species may disappear with no residues being produced.

The anolyte solution may have a pH of between 2 and 7. The anolyte solution may include species such as ClO ; ClO^- ; HClO ; OH^- ; H_2O_2 ; O_3 ; $\text{S}_2\text{O}_8^{2-}$ and $\text{C}_2\text{O}_6^{2-}$.

These species have been found to have a synergistic anti-bacterial and/or anti-viral effect, which is generally stronger than that of chemical bactericides and has been found to be particularly effective against viral organisms and spore and cyst forming bacteria.

The catholyte solution generally may have a pH of between 7 and 13 and a redox potential of between about -200 mV and -1100 mV. The catholyte solution may include species such as NaOH; KOH; Ca(OH)₂; Mg (OH)₂; HO⁻; H₃O₂⁻; HO₂⁻; H₂O₂⁻; O₂; OH⁻; O₂²⁻.

Both the physical characteristics of the anolyte and the catholyte are adjustable so as to be suitable for the particular application.

An embodiment of the invention will now be described as a non-limiting example only.

Example:

By using anolyte it is envisaged that one can achieve an increased shelf life for fish of up to 2 to 3 days. The proposed application of anolyte is as follows:

- 1) As ice for storage purposes; and
- 2) As a method of eliminating the bio-film on the inside surfaces of storage hulls in fishing trawlers and boats.

1. Ice:

By using anolyte in the form of ice, and in the storage of fish, the bacteria contamination in the ice is eliminated, as well as the contamination of the packed fish. As the ice melts, the anolyte is released to destroy the bacteria.

It is envisaged that the anolyte can be iced as either a concentrate, or in a diluted state with water, varying in dilution from 50% to as low as 20% dilution. The dilution would depend largely upon the contaminated state of the water used in the ice. Some trawlers for example use seawater in their ice. Seawater by nature is very contaminated.

The type of anolyte to be used in the ice is:

pH	-	± 7.5 ;
Amps	-	12 – 13 amps (24 volt);
ORP	-	± 450 mV; and
Pressure	-	0.5 bar (720ml/hr-production rate)

2. Bio-film:

Through applying anolyte as a fog within an empty hull of a trawler, one could eliminate the bio-film and thus the risk of recontamination of the fish during subsequent use.

The elimination of this bio-film will generally take place between fishing trips, while the trawler is in the harbor with its storage hulls empty.

It is envisaged that various methods of application such as fogging could be applied, as long as the droplet size of the fogged anolyte is small (around 4 to 12 micrometers) and the contact time is sufficient. Depending upon the extent of the bio-film, a number of fogging sessions could be required.

Fogging time will also depend upon the size and volume of the hull and the output of the fogging apparatus. Generally, one will fog until a thick fog has formed in the closed hull and the walls of the hull have been sufficiently wet by the anolyte fog so that droplets begin to form and run off (run-off stage). The hull would then be allowed to dry, before being fogged again.

It is envisaged that the type of anolyte to be used could be:

pH.	-	± 6.5 ;
Amps	-	12 – 13 amps (24 volts);
ORP	-	± 750 mV; and
Pressure	-	0.5 bar (± 750 ml/hr-output).

It is envisaged that it could be advantageous also to use anolyte as a general disinfectant in the processing and gutting of the fish, of both the process facilities and equipment

and of the product itself. Anolyte has very limited residue and thus an advantage over the other disinfectants on the market that are generally chemical based.

It will be appreciated that many variations in detail are possible without departing from the scope and/or spirit of the invention as defined in the consistory statements hereinbefore.

Dated this 25 day of May 1998


Patent Attorney/Agent for the Applicant